Recommended Maintenance for the Eclipse

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ISO 9001:2000 SGS

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Overview

- Routine Maintenance
  - Daily Maintenance
  - Weekly Maintenance
  - Monthly Maintenance
  - Quarterly Maintenance
  - Yearly As-Needed Maintenance
- Maintenance Review
- Summary

Routine Maintenance

- It is important to do routine maintenance on your Eclipse Purge-and-Trap Sample Concentrator.
- Doing routine maintenance will:
  - Optimize instrument performance and improve results
  - Minimize downtime and expense for repairs
  - Lengthen the overall lifetime of your instrument
- Most of the procedures described here can be easily and quickly performed by the instrument operator.
  - Described in the Eclipse manual
- Keep a log of your maintenance as a reference for when problems do arise.

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Daily Maintenance

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Daily Maintenance

- The daily maintenance on the instrument is the single most important thing you can do to ensure optimum performance and uninterrupted operation of your Eclipse.
- Daily maintenance will help identify and correct conditions before they develop into serious problems.

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Daily Maintenance Overview

- Trap conditioning
- Inspect the sparger frit
- Monitor the system pressure (during Purge)
- Inspect connections
- Review the run logs
- Inspect IS/SS and pressure in standard vessels
- Prime and monitor the SAM rotor
- Replenish the water reservoir
- Monitor one sample transfer
- Inspect the needle and needle-to-loop transfer line
- Monitor BFB tune check
- Monitor blanks
- Monitor the CCV

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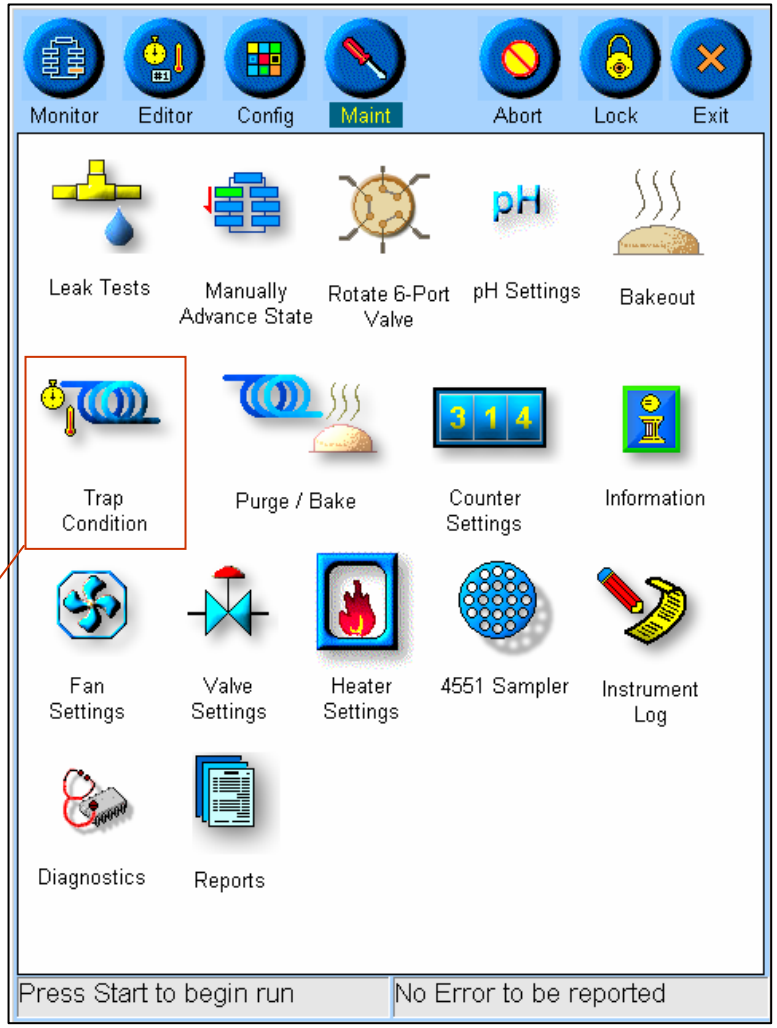
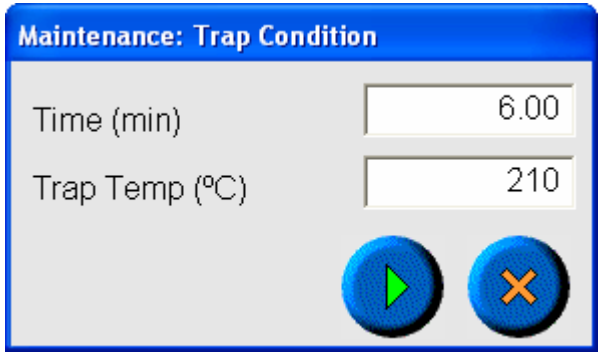
Daily Maintenance

- Trap Conditioning
  - Condition the trap on a daily basis immediately prior to running samples.
  - This can be done while the BFB tune check sample is running or while preparing the QC samples for the day to save time.
  - The automated procedure uses time and temperature parameters from Bake step of active Method.
  - The parameters can be over-written if desired.
  - Condition a new trap prior to analysis or bake an older trap if contamination is suspected.

Daily Maintenance: Eclipse Trap Conditioning

- Trap Conditioning (cont.)
  - Maintenance page, Trap Condition icon
    - User specified time and temperature
    - Fully automated
    - Auto-fills the time & temp with Active Method parameters





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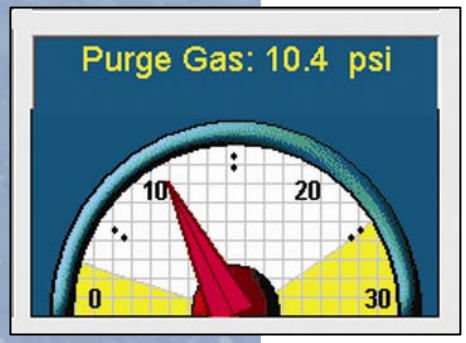
Daily Maintenance (cont.)

- Inspect the sparger frit
  - Visually inspect the sparger frit for signs of contamination or plugging from dirty samples.
- Monitor the system pressure (during Purge)
  - Monitor the system pressure during purge for signs of increasing pressure.
  - Should be about 8–12 psi during purge, depending on trap type and age.
- Inspect Connections
  - Visually inspect all connections at transfer lines and valves for signs of liquid leakage or corrosion.



System pressure during Purge

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Daily Maintenance (cont.)

- Review the Run Logs
  - Review electronic run log for “Foam Sensor” tripped or “Sparge Overfill Sensor” tripped.
  - This can indicate problems with valves, potential contamination, etc.
- Inspect IS/SS and Pressure of Standard Vessels
  - Visually inspect level of IS/SS.
  - Inspect pressure of standard vessels.

Daily Maintenance (cont.)

- Prime and Monitor the SAM Rotor
  - Prime the SAM rotor daily
  - Monitor for blockage in the line
- Replenish the Water Reservoir
  - Add clean water as necessary.
- Monitor One Sample Transfer
  - Visually monitor the transfer of at least 1 sample each day.
  - Watch for proper loop filling, complete sample transfer, leaks, function of AS pump or syringe, etc.

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Daily Maintenance (cont.)

- Inspect the needle and needle-to-loop transfer line
  - Visually inspect for signs of wear or breakage.
- Monitor BFB tune check
  - Monitor daily for MS performance.
- Monitor blanks
  - Monitor daily for contamination.
- Monitor the CCV
  - Monitor for development of problems with specifically difficult compounds.

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Weekly Maintenance

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Weekly Maintenance Overview

- Leak check
- Check the purge flow rate

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Weekly Maintenance

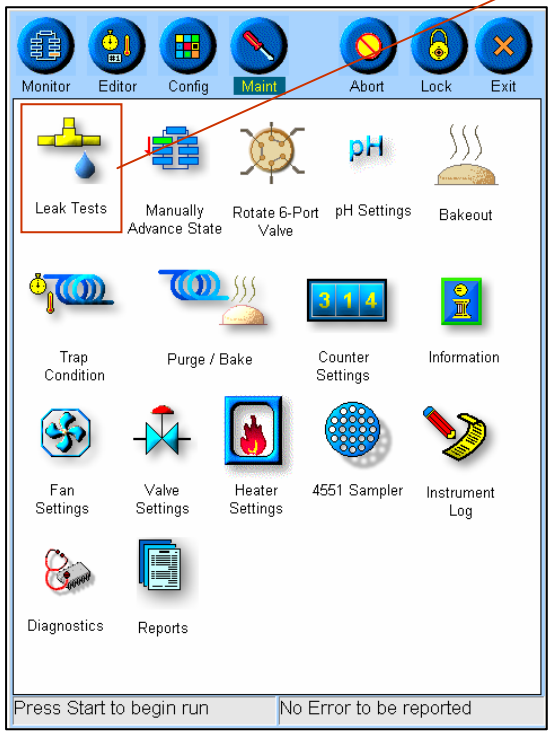
- Leak Check
  - Leak check the system weekly to monitor for developing leaks or increases in system pressure.
    - Run on the first day of the week (or another regularly scheduled day)
    - Maintenance page, Leak Tests icon
    - “Through Sparger” choice is usually sufficient
    - “Full” can be selected if a leaky Dry Purge valve (B) is suspected

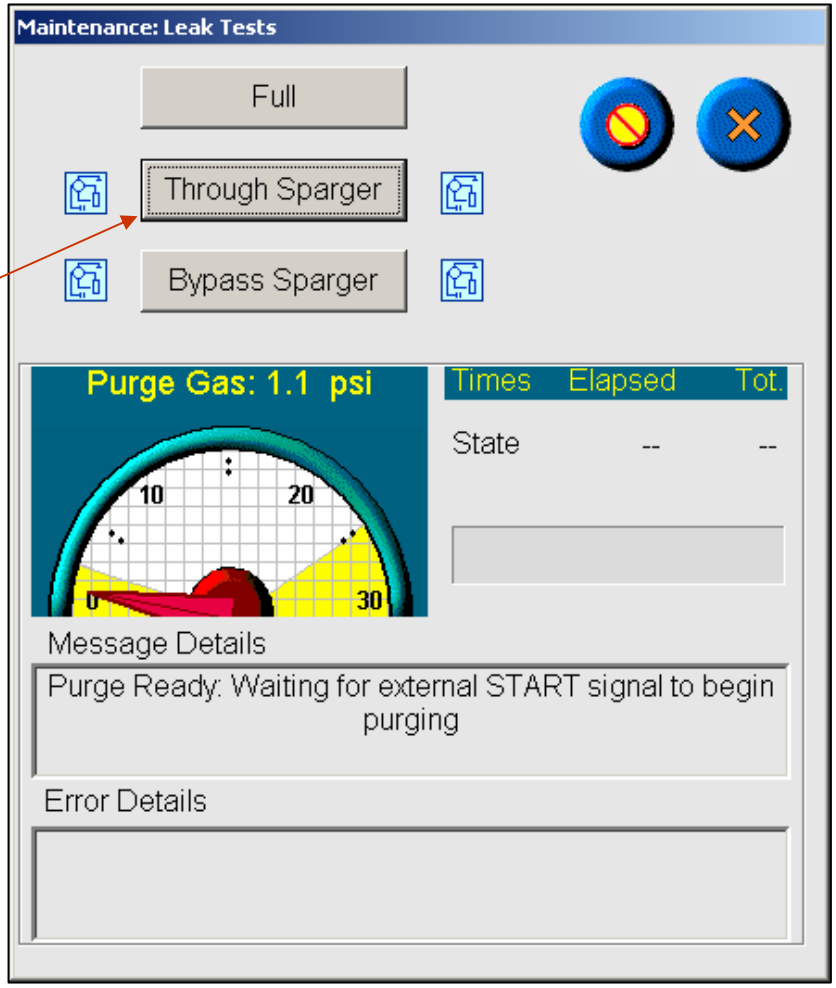
Weekly Maintenance (cont.)

- Leak Check (cont.)
  - Leak Check Failure
    - Indicates a leak in the system
    - Will lead to loss of analytes and poor recoveries
    - Must be repaired before analyzing samples
  - An increase in system pressure could indicate an aging trap or an obstruction in the sample pathway (e.g. at the foam filter).

Weekly Maintenance: Automated Leak Test

Perform automated system leak check by pushing one button. Checks with and without trap in line.





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Weekly Maintenance (cont.)

- Check the purge flow rate
  - Check the purge flow rate immediately after running the leak test procedure.
  - Procedure:
    - Add 5 mL of DI water to the sparge vessel
    - From the Maintenance page step the instrument to Purge
    - Measure the flow rate out the Purge vent on the front of the instrument
  - The purge flow rate should be 35–40 mL/min.

Monthly Maintenance

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Monthly Maintenance Overview

- Backflush the sample pathway with methanol
- Check the bake flow rate

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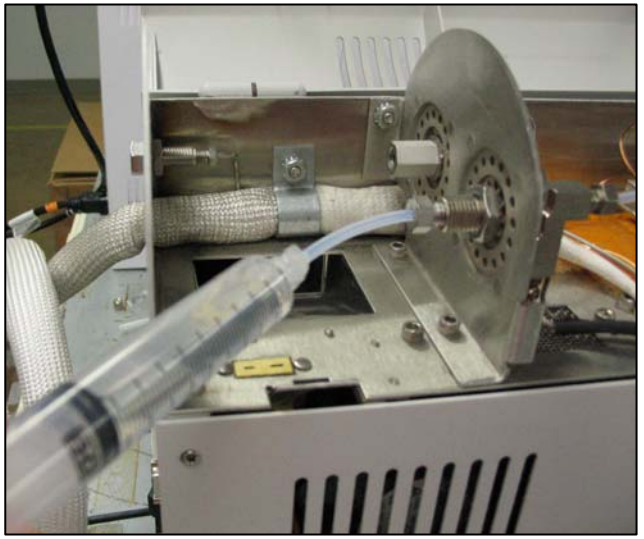
Monthly Maintenance

- Backflush the Sample Pathway with Methanol
  - Set instrument to Standby
  - Turn off power and unplug
  - Remove trap
  - Use tool and syringe to backflush pathway with methanol
  - Collect methanol in sparger
  - Remove methanol from sparger with syringe
  - Repeat 2–3 times
  - Install blank trap and bake system



See instruction sheet for full details on rinsing procedure

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Monthly Maintenance (cont.)

Methanol is removed from the sparger using the syringe and the 4-port valve on top of the sparge mount.

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Monthly Maintenance (cont.)

- Check the bake flow rate
  - Procedure:
    - From the Maintenance page, step the instrument to Bake
    - Measure the flow rate out the Bake vent on the front of the instrument
  - The bake flow rate should be approximately 80–120 mL/min.
  - The bake flow rate can also be checked while conditioning the trap.

Quarterly Maintenance

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Quarterly Maintenance Overview

- New analytical trap
- Water management fitting
- Clean dust and dirt
- Confirm operation of fans, valves, and heated zones
- Reset counters
- Disconnect and rinse the transfer line

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Quarterly Maintenance

- New analytical trap
  - Install and condition a new analytical trap.
    - The frequency of changing the analytical trap will depend on how many samples are run and how dirty or contaminated they are
    - With “average” use, change the trap quarterly to maintain optimum performance
  - A lab running samples 24 hours a day, 7 days a week and running dirty samples may need to change the trap more frequently, even monthly.
  - Leak test the system and condition the new trap after it has been installed.
  - In some cases, you may need to re-calibrate after installing a new trap.

Quarterly Maintenance (cont.)

- Water Management Fitting (WMF)
  - Remove and sonicate or replace the Water Management Fitting (WMF) and tubing assembly between WMF and 6-port valve.
  - The WMF and tubing assembly are considered consumable items.
    - Ni plating can degrade overtime, especially with dirty samples and continuous heating/cooling cycles
  - The WMF and tubing assembly are the only two pieces of the sample pathway that are in contact with the sample during both Purge and Desorb.

Quarterly Maintenance (cont.)

- Water Management Fitting (WMF) (cont.)
  - The WMF can be removed, sonicated, and baked quarterly to recondition it.
    - Can be sonicated 1 to 3 times to recondition before replacing
    - Will have to be replaced periodically
  - Also do this any time you observe drop in response or other analytical problems with the polar, or water-sensitive compounds.
    - Alcohols, ketones, ethers
    - Brominated compounds
    - Heavy compounds (last four on the list)

Quarterly Maintenance: Cyclone WMF

- Water Management Fitting (cont.)
  - Turn off power to the instrument and unplug
  - Remove the trap and retaining nut (trap side)
  - Remove the tubing assembly from the WMF to the 6-port valve
  - Remove WMF, being careful not to break the thermocouple and heater cables
  - **NOTE**: Always sonicate or replace the tubing assembly between the WMF and the 6-port valve at the same time!

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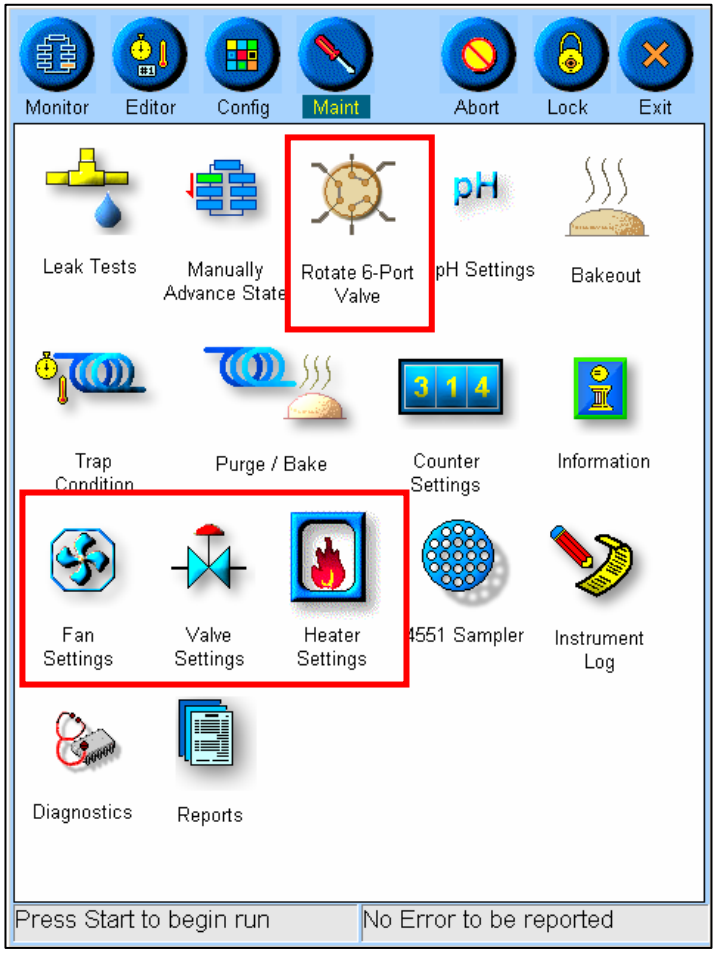
Quarterly Maintenance (cont.)



- Clean dust and dirt
  - Clean any accumulated dust and dirt on the fans and vents.
  - Clean any accumulated dust and dirt on the screen below the WMF.
- Fans, valves, and heated zones
  - Confirm operation
- Counters
  - Reset as necessary
- Transfer line
  - Disconnect and rinse

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Yearly Maintenance

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Yearly Maintenance

- Complete Preventative Maintenance (PM)
  - Once a year, the service engineer should perform a complete Preventative Maintenance on the system
  - Interview user for any problems or difficulties
  - Review instrument log file for error conditions
  - Inspect entire system for signs of wear, obviously broken parts, or other issues
  - Clean and remove any accumulated dust or dirt on vents, fans, and screens and reset counters
  - Check/confirm operation of all fans, valves, and heated zones and replace as necessary

Yearly Maintenance (cont.)

- Complete Preventative Maintenance (cont.)
  - Replace all pieces in the sample pathway
    - Sparger
    - Tubing assemblies
    - Water management fitting
    - Trap and trap bulkhead fitting
    - Transfer line to the GC
  - Perform a leak check of the system
  - Run a clean blank sample and BFB tune check sample
  - Run a mid-point calibration sample to confirm good chromatography and appropriate response for all compounds

“As Needed” Maintenance

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“As Needed” Maintenance Overview

- Trap conditioning
- Leak check
- Backflush the sample pathway

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“As Needed” Maintenance

- Trap conditioning
  - Condition the trap when first installed in the instrument
  - Trap conditioning can also be done any time that contamination or carry-over is observed
    - TRAP CONDITION icon for simple or routine conditioning
    - PURGE/BAKE icon for more thorough cleaning with programmable number of cycles
    - BAKEOUT icon for serious contamination raises temperatures of all heated zones and runs through P&T cycle multiple times
- Leak check
  - Leak check the system any time the system has been open to atmosphere (e.g. to change the trap)
  - Leak check any time analytical results show a loss of light compounds

“As Needed” Maintenance (cont.)

- Backflush the sample pathway
  - Backflush with methanol any time analytical results indicate a problem with polar compounds, brominated compounds, or heavy compounds at the end of the chromatogram
  - If this does not correct the problem, you may need to sonicate/bake the WMF and tube assembly or completely replace them

Summary of Daily Maintenance

Daily

- Trap conditioning
- Inspect the sparger frit
- Monitor the system pressure (during Purge)
- Inspect connections
- Review the run logs
- Inspect IS/SS and pressure in standard vessels
- Prime and monitor the SAM rotor
- Replenish the water reservoir
- Monitor one sample transfer
- Inspect the needle and needle-to-loop transfer line
- Monitor BFB tune check
- Monitor blanks
- Monitor the CCV

Summary of Weekly Maintenance

Weekly

- Leak check
- Check the purge flow rate

Summary of Monthly Maintenance

Monthly

- Backflush the sample pathway with methanol
- Check the bake flow rate

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Summary of Quarterly Maintenance

Quarterly

- New analytical trap
- Water management fitting
- Clean dust and dirt
- Confirm operation of fans, valves, and heated zones
- Reset counters
- Disconnect and rinse the transfer line

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Summary of Yearly Maintenance

Yearly

- Schedule a visit from your OI service engineer for a yearly Preventative Maintenance (PM) call.
- 1-800-336-1911

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Summary

- For optimum performance and minimal downtime of your Eclipse, perform all routine maintenance on a regular schedule.
- All of the procedures recommended here are described in the Eclipse user manual and can be easily and quickly performed by the instrument operator.
- Keep a log of your maintenance.
- For assistance with any of these procedures, contact the OI Analytical Technical Support Department at 1-800-336-1911.